

## Importance of the exercise testing in the socio-professional reintegration at patients with ischemic heart disease

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**Abstract.** Recovery and reintegration socio-professional is a program of education and exercises, specifically designed to enhance the quality of life for patients with cardiovascular pathology (myocardial infarction, post surgery for heart disease, arterial and venous peripheral pathology). Finally, recovery programs, is designed to increase the chance of patient survival, to help the patient to regain physical form previously had the disease, prevent exercise reconditioning and subsequent stroke. Recovery in cardiovascular disease begins in the period when the patient is still in hospital, ambulatory monitoring programs continue until the patient can safely performs their exercise program at home. The exercises involving various levels of monitoring, nutritional advice, emotional support and education of lifestyle changes in order to decrease the risk of cardiovascular mortality or relapse.

We conducted a prospective study of 206 patients on the correlation of depression and stress testing in patients with ischemic heart disease. Socio-economic factors that determine the socio-professional reintegration failure are related to age, sex, education level, professional qualification, the ratio between necessity and financial resources, the possibility of disability retired persons, retraining schemes. Impairment of work capacity is an essential criterion for the definition and characterization of disease severity, accident and disability status, and is influenced by how the person fits into the work process. Work capacity assessment and recovery was made by specialist medical expertise of work capacity which activity was centered on disability prevention and recovery of working capacity, with finality in socio-professional reintegration of patients. Recovery of working capacity, with finality in socio-professional reintegration aggrieved by disease or accident.

**Key words:** *stress test, ischemic heart disease, professional reintegration, cardiac rehabilitation.*

### Introduction

Impairment of work capacity is an essential criterion for the definition and characterization of disease severity, accident and disability status, and is influenced by how the person fits into the work process.

Quality of life in patients with ischemic heart disease is dramatically affected, risks being accompanied by prolonged inactivity, often the patient is had to pull back for a period of social and professional life (1-3). Because the number of patients with ischemic heart disease has increased in recent years, the company could not cope as a quarter or even a third of its population to be forced to stay bedridden or indication of inactivity (4). There are numerous studies according to which patients with ischemic heart disease (5-7) mobilizes quickly and will begin physical activity supervised, progressive and individualized more chances of recovery, survival and socio-professional reintegration grow.

The use of exercise testing in coronary artery disease based on two premises. The first is the fact that, in the initial stage of the disease, ischemia is absent at rest and is present only during periods of stress. Due to this stress test is useful in diagnosis of coronary heart disease detection respectively (8). The second premise is the finding that in the advanced stages of the disease, myocardial ischemia is present at rest but significantly worsens during periods of stress in direct proportion to the severity of the disease. This makes stress testing to be useful in evaluating patients with coronary heart disease.

Exercise tolerance test is a method for diagnostic and prognostic assessment of patients with ischemic heart disease or suspected installed. During the exercise, coronary blood flow must increase to meet increased myocardial metabolism.

Limitation of coronary blood flow can lead to changes in the electrocardiogram (9,10). Exercise testing has a sensitivity of 78% and a specificity of 70% for detection of coronary artery disease.

Consequently, it cannot be used as a diagnostic test as positive or negative for coronary disease unless it is considered a disease of the coronary arteries. Complications that can occur during exercise testing are:

hypotension, congestive heart failure, severe cardiac arrhythmia, myocardial infarction, acute cerebral circulatory failure, syncope or stroke, physical trauma accidental death.

Limiting stress test is represented by ST segment depression as a primary indicator of myocardial ischemia. False negative tests are those that reduce sensitivity. False positive tests are those that reduce specificity.

The main criteria followed in exercise testing as prognostic markers are the changes on electrocardiogram, hemodynamic alterations and symptomatic manifestations.

Tracked changes on the electrocardiogram are the wave ST: ST elevation maximum ST depression maximum orientation slope depression - ST (downward, horizontal, upward), the number of leads with ST-segment abnormalities, between the return of the amendment ST indices ST/heart rate, exercise-induced ventricular arrhythmias, ST segment lasting change. Tracked changes in hemodynamically are maximum heart rate, maximum systolic blood pressure, oxygen consumption maximum infarction: TAs x FC, the test effort, hypotension (less than the original value), chronotropic incompetence.

Desired changes in point of view are the symptomatic angina, angina and other symptoms during the test limits.

The appearance of the route normally during exercise is the point J becomes depressed during the year, reaching a maximum bump the culmination of effort.

Predicted maximum heart rate is calculated as follows: 220 (210 women) - patient age. A satisfactory response heart rate is reached at 85% of your maximum heart rate. Keeping a maximum heart rate is a favorable prognostic sign.

Normal electrocardiographic changes during exercise include increased P-wave amplitude, increased R-wave amplitude, J point elevation, ST segment becomes slightly upward, shorten the QT interval, T wave amplitude decrease

Electric myocardial ischemia criteria are: horizontal or descending depression less 1mm ST segment persists at least 0,08s or less 1mm ST segment elevation in derivatives other than aVR or V1, meaning elevation in leads with Q wave is present controversial. Other followed criteria are slowly ascending ST segment depression to 2mm, which persist for at least 0,08s of section J, additional ST segment changes less than or equal to 1mm in patients with ST changes rest pseudo normalization T wave (T wave negative becomes positive effort idle) to low heart rate and accompanied by chest pain, inversion U.

Electrocardiographic changes occurred during the exercise test, ST depression as others deserve attention. Electrocardiographic changes are varied and have different meanings from the void of physiological change, which lead to the interruption alarming exercise test.

There was no cardiac death during exercise is tested, regardless of the underlying disease patients. Patients and gave and signed the agreement to participate in the study.

Work capacity is defined by the possibility of an activity by which the person shall maintain his family and (6-8,13). Ability to work is expressed as a ratio between individual biological possibilities (evaluated strictly medical terms) and request training (as medico-social element). Work capacity is determined by the physical and intellectual abilities genetically determined and the level of socio-professional integration that takes training and experience.

## Material and Method

We conducted a prospective study of 206 patients with ischemic heart disease. They were followed for 48 months. All patients underwent history, clinical examination to identify symptoms and signs of ischemic heart disease, hospitalization, at discharge, 6 months and annually. All patients performed stress test strip. Patients were from urban and rural areas. Some patients were divided into groups that were active in the socio-professional aiming to length of service and the date of inclusion in the study, unemployed or inactive for socio-professional.

*Data Analysis.* We used software for data analysis EpiInfo version 7. To make it better correlation of data and eliminating errors we used Anova F test Levine and Gabriel Tukeys Post hoc, chi square test Fisher.

## Results

The average age of the batch depending on length of employment: under 15 years - 48 people aged 50±5 years; 15-25 years - 80 per person, age 52±4 years; 25-35 years - 47 per person, age 52±5 years; 35 years, mean age 31 of the person 53± years. The test one-way ANOVA F (3; 202) = 4.03.

Critical value for degrees of freedom is  $3.202 < 2.70$ . F value is greater than the critical value.  $p = 0,008$ . Following analysis of variance (test LEVINE),  $p = 0.871$ , not significant. Gabriel applies post-hoc tests and Tukeys. There are significant differences between the mean ages of patients older in the workforce under 15 and 15-25, under 15 and over 35.

There are statistically significant association between the area of origin and the existence of unemployment,  $p = 0.002$ , OR = 0.35 (0.17 to 0.70, IC 95) used chi square test. There are statistically significant association between origins, environment and professionally active people,  $p = 0.0009$ , OR = 0.35 (0.18 to 0.66, IC 95) used chi square test. No association between environment origins, and the existence of 183 leave days,  $p = 0.211$ , Chi square test used. No statistical significance between environment origins, and medical leave 365 days,  $p = 0.201$ , test used Fisher.

Batch no association between sex and unemployment,  $p = 0.49$ , Chi square test. Batch no association between sex and if they are professionally active,  $p = 0.14$ , chi square test.

Regarding employment levels each year and how it evolved each patient, we averaged the year degrees. We hooked each year following the year\_(table I, II, III). All three pairs are statistically significant differences between their environments (table I, II, III).

**Table I. Paired samples statistics**

	Year	Mean	N	Std. Deviation	Std. Error Mean
Pair 1	2011	2.8350	206	.55166	.03844
	2012	2.5146	206	.99132	.06907
Pair 2	2012	2.5146	206	.99132	.06907
	2013	2.1214	206	1.18931	.08286
Pair 3	2013	2.1214	206	1.18931	.08286
	2014	1.7573	206	1.30265	.09076

**Table II. Paired samples correlations**

	Years	N	Correlation	Sig.
Pair 1	2011 & 2012	206	.138	.048
Pair 2	2012 & 2013	206	.679	.000
Pair 3	2013 & 2014	206	.753	.000

**Table III. Paired samples test**

	Years	Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	2011 – 2012	.32039	1.06577	.07426	.17398	.46679	4.315	205	.000
Pair 2	2012 – 2013	.39320	.89211	.06216	.27066	.51575	6.326	205	.000
Pair 3	2013 – 2014	.36408	.88261	.06149	.24284	.48532	5.921	205	.000

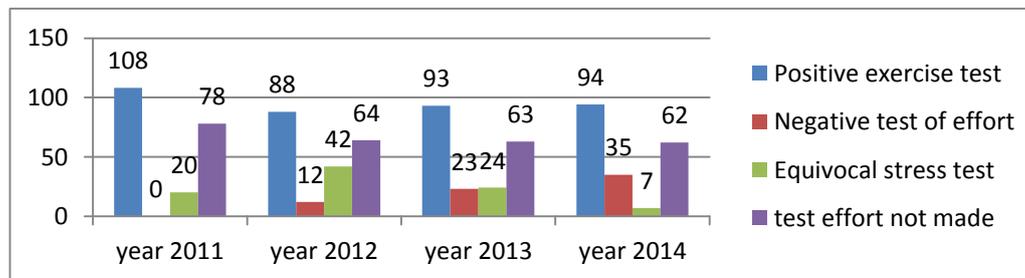
*Association between generalised joint hypermobility and upper/lower limb injuries.* Table 3 shows that there was no significant association between generalised joint hypermobility and upper limb injuries. It however showed that there was significant association between generalised joint hypermobility and lower limb injuries. Inclusion in the study of all patients and conducted test effort during the four years of effort test was repeated whenever there was a suspicion (figure 1). ANOVA (a parametric test for inequality of population means), has shown that there are significant differences between the mean ages of effort and test results.

Following the test effort that came out inconclusive, some patients underwent coronary angiography were performed to verify the exact condition and detect potential coronary artery stenosis that can compromise blood flow to the heart muscle.

After performing his angiography yielded the following data: patients with a single coronary disease (15 in number) t test,  $p = 0.681$ , not significant. Second patients with compromised coronary arteries (51 in number) t test,  $p = 0.087$ , not significant. 3 patients with compromised coronary arteries at number 46 t-test,  $p = 0.983$ , not significant. Patients who required angioplasty with stent revascularization was 61 in number t-test,  $p = 0.209$ , not significant. Patients who required coronary bypass surgery was (21 in number) t test,  $p = 0.112$ , not significant.

Complying degree of disability: in the year 2011 in the third degree were employed 138 patients (66.99%) in the second degree of disability-52 (25.44%) patients who received 365 days of sick leave 17 (8.25%).

In 2012 the evolution fit into the degree of disability: 24 patients (11.65%) were reintegrated in terms of socio-professional, 22 patients (10.67%) have started a vocational integration 4 hours, 3 patients (1.45%) of your health condition worsened being employed in degree of disability, the remaining 157 patients (76.21%) were classified in grade III disability.



**Figure 1.** Results of the exercise tests in the 4 years studied

In 2013 evolution of enrollment in 2012-14 compared to the degree of disability of patients (19.90%) have resumed their activity socio-professional entirely in the third degree of disability remained 115 (55.82%) 2 patients found to worsening health and three patients died. In 2014 the evolution of enrollment in degree of disability compared to 2014: 57 patients (27.66%) were integrated in terms of socio-professional, in the third degree of disability remaining 87 patients (42.33%) of that 30 patients (34.48%) were employed in terms of socio-professional 4 hour, seven patients died.

### Discussion

In assessing the work capacity aims treatment and its effects. Diagnostic criteria for functional disability and adaptive capacity assessment work are periodically updated and improved to be aligned to any specifications and regulations in the medical field that arise along the way (9,11,12).

The criteria for the clinical diagnosis, functional diagnosis and assessment of work capacity on which is framing disability in grades: grade I, grade II, grade III are regulated by government resolution No. 155 of 23 February 2011 (9,11-13).

Disablement can be gauged in relation to daily activities or professional development (13): grade I of disability - characterized by total loss of working capacity, the ability to self requires permanent assistance from another person; grade II of disability - characterized by total loss of working capacity, but with preservation of the capacity of self-service; grade III of disability - characterized by loss of at least half of the work capacity, the patient may have a part-time.

In the slight deficiency (inability adaptive 20-49%) not significantly affects daily activities and professional; contraindications may arise regarding the professional activity / recommendations on changing jobs; working capacity is preserved. In the average deficiency (inability adaptive 50-69%) there is a limited adaptive capacity to the professional environment in terms of the program or the workplace; ability to work is reduced by at least half the standard. The pronounced deficiency (inability adaptive 70-90%) - prevents pursue employment in the organized system of work; ability to work is lost totality. In the serious deficiency (inability adaptive 90-100%) has been lost, in addition ability to work, and the self service.

### Conclusions

Effective, rapid treatment of ischemic heart disease has primary end patient recovery and reintegration complete and rapid cardiac event in the previous environment. Reinsertion depends on medical rehabilitation, psychological factors, economic factors and previous work. (9,11,12).

Factors that determine the socio-professional reintegration STARE failure are 3 types, medical factors, psychological factors and previous work.

Medical factors are the severity of cardiac pathologies associated side effects of drugs, medical influences varied and contradictory cardiologist, family doctor, occupational physician and doctor of medical expertise of work capacity.

Psychological factors regarding socio-professional reintegration are influenced by psychological profile before the event at coronary degree of anxiety and depression, and to adapt to the disease.

Factors influencing previous work are represented by previous conflicts in the workplace, professional devaluation, unemployment, lack of reinsertions professional for age and previous training adapted to current labor market, attitudes regarding family reintegration work.

In the second year of study, 24 (11.65%) of patients have resumed full professional activity and 22 (10.67%) of patients began to work part-time and 3 (1.45%) patients health condition worsened a lot.

In the 3<sup>rd</sup> year of the study 41 patients (19.90%) have resumed activity completely. In the 4<sup>th</sup> year of the study 57 patients (27.66%) have resumed their professional activity completely. During the study, only 7 patients health was greatly aggravated, they lost their ability to work and self-management skills

Socio-economic factors that determines the socio-professional reintegration failure are related to age, sex, education level, professional qualification, the ratio between necessity and financial resources, the possibility of disability pensioners (7). Impaired work capacity is an essential criterion for the definition and characterization of disease severity (1,5,9), accident and disability status, and is influenced by how the person fits into the labor process (5.6).

Work capacity assessment and recovery was made by specialist medical expertise of work capacity which activity was centered on disability prevention and recovery of working capacity, with finality in socio-professional reintegration of patients (5-7).

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Received: March 14, 2016

Accepted: May 25, 2016